

***FlyBy Math™* Alignment**
Mathematics Grade Level Expectations
March 20, 2006 v.5

Strand: Number, and Operations

Grade-Level Expectations

M(N&O)–7–4 **Accurately solves problems involving** proportional reasoning; percents involving discounts, tax, or tips; and rates.

***FlyBy Math™* Activities**

--Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.

M(N&O)–7–7 **Makes estimates** in a given situation (including tips, discounts, and tax) by identifying when estimation is appropriate, selecting the appropriate method of estimation, determining the level of accuracy needed given the situation, analyzing the effect of the estimation method on the accuracy of results, and evaluating the reasonableness of solutions appropriate to grade level GLEs across content strands.

--Predict outcomes and explain results of mathematical models and experiments.

Strand: Functions and Algebra

Grade-Level Expectations

M(F&A)-7-1 **Identifies and extends to specific cases a variety of patterns** (linear and nonlinear) represented in models, tables, sequences, graphs, or in problem situations; **and generalizes** a linear relationship using words and symbols; generalizes a linear relationship to find a specific case; or writes an expression or equation using words or symbols to express the **generalization** of a nonlinear relationship.

***FlyBy Math™* Activities**

--Represent distance, speed, and time relationships for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system.

M(F&A)-7-2 **Demonstrates conceptual understanding of linear relationships** ($y = kx$; $y = mx + b$) **as a constant rate of change** solving problems involving the relationship between slope and rate of change, by describing the meaning of slope in concrete situations, or informally determining the slope of a line from a table or graph; **and distinguishes between constant and varying rates of change** in concrete situations represented in tables or graphs; **or describes how change in the value of one variable relates to change in the value of a second variable** in problem situations with constant rates of change.

--Represent distance, speed, and time relationships for constant speed cases using linear equations and a Cartesian coordinate system.

--Use graphs to compare airspace scenarios for both the same and different starting conditions and the same and different constant (fixed) rates.

--Interpret the slope of a line in the context of a distance-rate-time problem.

Strand: Data, Statistics, and Probability

Grade-Level Expectations

M(DSP)–7–3 **Organizes and displays data** using tables, line graphs, scatter plots, and circle graphs to answer questions related to the data, to analyze the data to formulate or justify conclusions, to make predictions, or to solve problems.

FlyBy Math™ Activities

--Choose among tables, bar graphs, line graphs, a Cartesian coordinate system, and equations to model aircraft conflicts and predict outcomes.

--Explain and justify solutions regarding the motion of two airplanes using the results of plotting points on a schematic of a jet route, on a vertical line graph, and on a Cartesian coordinate system.

M(DSP)–7–6 **In response to a teacher - or student-generated question or hypothesis**, decides the most effective method (e.g. survey, observation, experimentation) to collect the data (numerical or categorical) necessary to answer the question; collects, organizes and appropriately displays the data; analyzes the data to draw conclusions about the questions or hypothesis being tested, while considering the limitations that could affect interpretations; and when appropriate makes predictions, asks new questions, or makes connections to real-world situations.

(IMPORTANT: *Analyzes data consistent with concepts and skills in M(DSP)–7–2*)

--Conduct simulation and measurement for several aircraft conflict problems.

--Represent distance, rate, and time data using tables, line plots, bar graphs, and line graphs.

--Use tables, bar graphs, line graphs, equations, and a Cartesian coordinate system to draw conclusions.

Strand: Problem Solving, Reasoning, and Proof

Grade-Level Expectations 6-8

M(PRP)–8–1 **Students will use problem-solving strategies to investigate and understand increasingly complex mathematical content** and be able to:

- Use problem-solving strategies appropriately and effectively for a given situation.
- Determine, collect and organize the relevant information needed to solve real-world problems.
- Apply integrated problem-solving strategies to solve problems in the physical, natural and social sciences, and in pure mathematics.
- Use technology when appropriate to solve problems.
- Reflect on solutions and the problem-solving process for a given situation and refine strategies as needed.

FlyBy Math™ Activities

--Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.

Strand: Communication, Connections, and Representations

Grade-Level Expectations 6-8

M(CCR)–8–1 **Students will communicate their understanding of mathematics** and be able to:

- Articulate ideas clearly and logically in both written and oral form.
- Present, share, explain, and justify thinking with others and build upon the ideas of others to solve problems.
- Use mathematical symbols and notation.
- Formulate questions, conjectures, definitions, and generalizations about data, information, and problem situations.

FlyBy Math™ Activities

--Predict outcomes and explain results of mathematical models and experiments.

--Explain and justify solutions regarding the motion of two airplanes using the results of plotting points on a schematic of a jet route, on a vertical line graph, and on a Cartesian coordinate system.

Grade-Level Expectations 6-8

M(CCR)–8–2 **Students will create and use representations to communicate mathematical ideas and to solve problems** and be able to:

- Use models and technology to develop equivalent representations of the same mathematical concept.
- Use and create representations to solve problems and organize their thoughts and ideas.
- Convert between representations (e.g., a table of values, an equation, and a graph may all be representations of the same function).

FlyBy Math™ Activities

--Represent distance, speed, and time relationships for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system.